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A Safe, Eaſy, and Expeditious

METHOD

Of procuring any

QUANTITY

OF

FRESH WATER at SEA;

BY A

MENSTRUUM entirely innocent and inoffenſive: Highly beneficial, and earneſtly recommended to all Sea-faring Perſons: Calculated to alleviate thoſe Hardſhips and Miſeries, to which a Scarcity of FRESH WATER reduces them.

Together with an

APPENDIX.

CONTAINING

An eaſy Method of preſerving FRESH WATER entirely pure, ſweet, and wholſome, during the longeſt Voyages, and in the warmeſt Climates.

By *THOMAS BUTLER*, M. D.

Pro hominis utilitate.

LONDON:

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(Price One Shilling.)

BRITISH MUSEUM

TO THE

RIGHT HONOURABLE

GEORGE LORD ANSON,

Of Soberton,

Firſt COMMISSIONER *for Executing the Office*

OF

LORD HIGH ADMIRAL *of* ENGLAND, *&c.*

The following TREATISE

Is moſt Humbly Inſcrib'd,

By,

His LORDSHIP'S

Moſt devoted and

Moſt obedient,

Humble Servant,

THOMAS BUTLER.

A New, Eaſy, and Expeditious
METHOD
Of procuring any QUANTITY of
FRESH WATER at *SEA*.

A CONTINUAL Supply of Good, and Wholeſome Freſh Water, is unqueſtionably one of the greateſt Bleſſings that can poſſibly attend a Sea-faring Life; as it is ſo indiſpenſably neceſſary to the Preſervation of Health; and as the Want of it, renders Sailors liable to the Attacks of many grievous Maladies, whoſe Conſequences too often prove fatal. It has been, and, I'm perſuaded, ſtill is the chief Care and Concern of Captains, and Maſters of Ships, and others whoſe Buſineſs it is to victual them, to lay in ſuch a Quantity of Water, and other neceſſary Proviſions, as are judged ſufficient for the Nature, or Length, of the Voyage: But there are ſo many Accidents and Miſfortunes, to which Ships at Sea are expos'd, from the ordinary Viciſſitudes and Changes of the Wind and Weather; Accidents, which the utmoſt Stretch of Human Wiſdom cannot foreſee, nor the moſt vigorous Exertion of natural Strength prevent; that the moſt prudent and ſalutary Meaſures are frequently fruſtrated, and both Cargoe and Proviſions readily parted with, to preſerve the Ship from Sinking, and her unhappy Crew from the Jaws of that Deſtruction, which would otherwiſe be inevitable.

ALTHOUGH a ſerious Reflection upon theſe calamitous Circumſtances, cannot but excite an earneſt Wiſh, that ſome Method might be found out to ſoften and alleviate them; yet I muſt confeſs, that I have looked upon Diſcoveries of this Nature, as a

Good rather to be wiſhed for, than expected; and apprehended them to be attended with ſo many Difficulties, as to render them almoſt impracticable. But obſerving a Report in the publick Papers, ſometime in the Month of *March* 1753, that two *Gentlemen* juſt then arrived from *Ireland*, had diſcovered a Method of procuring Freſh Water, from Water taken up at Sea; it ſet me upon making a particular Enquiry into the Nature and Properties of Sea Water, how far it was capable of Tranſmutation, and whether the ſeveral Particles with which it is impregnated, and their inherent Qualities, could be ſo effectually extracted and removed, as to render it perfectly freſh and potable.

I AM not yet certain, whether the above Report was ſtrictly true, or whether the Diſcovery ſaid to have been made by theſe two *Gentlemen*, was ever properly examined, or at all practiſed: But I was induced to the making ſuch an Enquiry, from the Conſideration of what the late learned and ingenious Mr. *Boyle*, has ſaid upon this Subject. He very juſtly obſerves, ‘ That the Diſcovery of a Method of ſeparating Freſh Water, from that which was Salt, would be very beneficial to Navigation, and conſequently to Mankind: For (ſays he,) in long Voyages, 'tis but too common to be liable to Hazards and Inconveniencies, for Want of Freſh and Sweet Water; whereby Men are ſometimes forced to drink corrupt, brackiſh Water, which gives them ſeveral Diſeaſes, particularly the Scurvy, and the Dropſy: And Seamen receive ſo many other Inconveniencies, through the Want of Freſh Water, that to prevent, or ſupply it, they are often forced to change their Courſe, and ſail ſome hundred Miles to a dangerous Coaſt, by which Means, they often loſe the Benefit of their Trade-Winds, and frequently of their Voyage.’

And I was further encouraged in the Proſecuting of this Deſign, as its being in ſome Degree practicable, may be gathered from the Teſtimony of that famous Navigator Sir *R. Hawkins*, who commanded a Fleet in the *Indies*, for Queen *Elizabeth*. This Gentleman, in the judicious Account he gives of his Voyage, wherein they were diſtreſſed, even in the Admiral's Ship, for Want of Freſh Water, has this memorable Paſſage: 'Although our Freſh Water had 'failed us many Days (before we ſaw the 'Shore,) yet with an *Invention* I had in my 'Ship, I eaſily drew out of the Water of 'the Sea, a ſufficient Quantity of Freſh Wa-'ter to ſuſtain my People, with little Ex-'pence of Fuel, for with four Billets I ſtill'd 'a Hogſhead of Water, and therewith dreſ-'ſed Meat for the Sick and Whole. The 'Water ſo diſtilled, we found to be Whole-'ſome and Nouriſhing.'

Though this great Man has left us in the Dark, as to the *Invention* itſelf; yet I think thus much may be inferred, that Sea Water may by Diſtillation, be rendered perfectly Freſh, and fit for Uſe; eſpecially if we pay any Regard to a received Maxim in Naturals, *That what has been, may be.*

In the Proſecution of my intended Inquiry, and upon the Credit of theſe two great Authors, I made ſeveral Experiments upon Sea Water by Diſtillation, at the Elaboratory of the *Diſpenſary*, in *Great-Ruſſel-Street, Covent-Garden*: But found, that although the Preparations I uſed, were attended with the expected Succeſs, in making Sea Water perfectly Freſh; yet the Practice of them at Sea, would probably be attended with many conſiderable Hazards and Inconveniencies, eſpecially as they were all Chymically compounded, and to Perſons not well ſkilled in their Nature and Effects, might prove very pernicious.

This put me upon making ſome Trials of Compoſitions, of a ſimple and harmleſs

Nature; which were of themſelves, entirely diveſted of thoſe Qualities, that rendered the other Experiments unſafe and impracticable: And after a very laborious Application to this Deſign, I have at Length diſvered a MENSTRUUM, which fully anſwers the Purpoſe of extracting Freſh Water, from Water taken up at Sea; A *Menſtruum*, ſo ſafe in its Nature, ſo reaſonable in the Purchaſe, and to be had at all the Sea-Ports, and principal Towns in the Kingdom, and which I have ever found, attended with a conſtant, uninterrupted Succeſs; that I cannot ſo far diſpenſe with that Obligation, which lies upon every Individual, to advance the Good of the great Community of Mankind, as to conceal it any longer from the World.

BUT as a Diſcovery ſo evidently beneficial to that Set of Men, who *occupy their Buſineſs in the great Waters*, and ſo *entirely new* in itſelf, cannot be too circumſtantially delivered; I hope I ſhall not incur the Charge of Prolixity, in laying down the Directions neceſſary to be obſerved, in the Application of this Method, in a very particular Manner; nor be looked upon with Contempt by the learned Part of the World, if I avoid interlarding them with any abſtruſe Terms, or Phraſes, that may not be ſo generally underſtood by thoſe Perſons, for whoſe Benefit and Advantage this Publication is ſolely intended.

THE *Menſtruum* which I have diſcovered, differs, in two very material Circumſtances, from any hitherto publiſhed: As it has no ſuch *noxious Quality* as to render the Veſſel in which it is diſtilled unfit for any other Purpoſe; And as it is not to be had at only one or two *particular* Places, but at moſt of the Sea Ports, and principal Towns in his Majeſty's Dominions.

To purchaſe and erect a Still, peculiarly for this Purpoſe, would be not only expenſive, but very inconvenient: And as the *Menſtruum* is of a very ſafe Nature, and entirely free from every Thing that may prove offenſive or pernicious; I think the Ship's *Boiler*, is altogether as fit and proper for this Uſe, as any other Veſſel: And more ſo, it being generally divided into two Parts; and as the Parts appropriated for boiling Beef and Pork, Peaſe and Burgoo, are (or may be) uſed at the ſame time, I apprehend, that Part aſſigned for boiling Peaſe, *&c.* would be the fitteſt to be uſed in this Diſtillation, as the Communication of the Heat from the other Part, will greatly aſſiſt the Water in running off, and will render much leſs Fuel neceſſary, than there would otherwiſe be occaſion for.

To this Part of the Boiler, therefore, there muſt be a Head fixed, made of *Copper*, and *well tinn'd*, to prevent its contracting Verdigreaſe; the Spout to which, I would adviſe to be made of *Pewter*. The

Head muſt likewiſe be of that Sort commonly called a *Moor's-head,* which for its Cheapneſs, and Conveniency, in this Caſe, I judge preferable to any other Heads in Uſe. There muſt alſo be a Worm, and Tub; though in ſmall Ships, I would adviſe the Uſe of a *Bucket-head,* as it requires neither Worm, nor Tub; which might be inconvenient in ſuch Ships, on account of the Room they take up. When your Head, Worm and Tub, are ready, you may take up the Water *along ſide* the Ship, and put it into the *Boiler* through a Hole which muſt be made in the upper Part of the Boiler, to fix a Funnel in, with one meaſured *Wine Quart* of the ſtrongeſt *Soap Lye,* or *Lees* you can get, (commonly called *Capital Lees)* to fifteen Gallons of Sea Water; and ſo in Proportion, to a greater or leſs Quantity; always obſerving, not to fill the Boiler (be it ever ſo large) above three fourths full, that the Vapour may not be confined, but have Room to riſe. When this is done, fix on the Head to the Boiler, and the Spout to the Mouth of the Worm, and lute the Joinings of both together, with a Paſte made of ſcraped Chalk, and fine Flour of each equal Parts, wetted with as much freſh Water, as will bring it to the Conſiſtency of Dough. You muſt then be careful to ſtop the Hole above-mentioned, with a ſmall Piece of Copper, (rather than a Cork) made ſo as to ſlide backward and forward over it. When you have thus ſtopt the Hole, and filled the Worm Tub with Sea Water, (which will do very well to keep the Worm cool) you may light up your Fire, which muſt be moderate, as too great a one will occaſion the Water to boil over, and run foul, which muſt be very carefully prevented. The beſt Way to know how to regulate your Fire, will be frequently to taſte the Water as it runs off; and if you find it perfectly freſh, and well flavoured, continue the Fire as it is; if otherwiſe, diminiſh it a little, till you perceive the Water runs freſh; though you muſt ſtrictly obſerve the above Caution, not to let the Water boil over.

ANOTHER Thing neceſſary to be obſerved in the Diſtillation, is to keep a pretty ſmall Stream running, till you think you have run off half or more of the Freſh Water you expect from the Quantity of Sea-Water at firſt put in; which will generally bear the Proportion of *Twelve Gallons* of Freſh Water, to *Fifteen Gallons* of Sea Water. You may then increaſe your Fire, and continue running off Freſh Water, till you apprehend there is no more Sea Water in your Boiler, than what is requiſite to keep its Bottom from burning; (which may be about two or three Gallons, more or leſs, according to the Bigneſs of it) then by putting a Funnel into the Hole in the upper Part of the Boiler, you may pour in the ſame Quantity of

Sea Water as before, and continue the Diſtillation as at firſt, with a ſmall Stream, till you have drawn off much about half the expected Quantity of Freſh Water; and then increaſing the Fire, you may run off the reſt, in the Manner above directed. By thus repeating the Quantity of Sea Water, and keeping up the Diſtillation, you may have a conſtant Stream of Freſh Water running both Night and Day; for the Quantity of *Lees* at firſt put in, (obſerving carefully the due Proportion of one meaſured *Wine Quart* of *Capital Lees*, to fifteen Gallons of Sea Water) will bear a Repetition of the ſame Quantity of Water, four or five Times, or oftner; for as long as the Water comes off freſh, ſo long the Strength and Virtue of the MENSTRUUM remains entire and unimpaired: Nor need the Head of the Boiler be ever taken off during the whole Proceſs, as the above-mentioned Hole is calculated to convey the Water into the Boiler, and to prevent any Inconvenience, which the taking off the Head ſo frequently might be attended with.

ANOTHER Thing further neceſſary to be obſerved in the Courſe of this Diſtillation, is to keep the Worm always cool, by conſtantly filling up the Tub with a freſh Quantity of Sea Water, whenever you perceive the Water formerly put in begins to grow very hot: Becauſe if this is not carefully attended to, the Water will run brackiſh, and the Succeſs of the Proceſs will be greatly hindered and obſtructed. To prevent any Accidents of this Nature, I would recommend it to the Surgeons, and their Mates, on board thoſe Ships which carry ſuch, and to the Captains or Mates of ſmaller Veſſels, to ſuperintend the Diſtillation, and obſerve that every thing neceſſary to the Proſecution of it, be under a proper Management and Regulation. And as it may frequently happen,

pen, That by the Motion or Surging of the Ship the Water in the Tub may often run over; to remedy the Inconvenience ariſing from hence, and to leſſen the Trouble of conſtantly keeping the Tub filled; I would adviſe the Uſe of *Wet Swabs*, which by being wrapt round the Worm, and taken off and new dipt, as ſoon as ever they grow very hot or dry, the Worm will always be kept cool, and the Diſtillation carried on in a proper Manner.

WHEN you have drawn off as much Freſh Water by the foregoing Method, as your Occaſions require; the Boiler ſhould be waſhed out very clean with common Sea Water, in the ſame Manner as is generally done after it has been uſed for any other Purpoſe: And particular Care muſt alſo be taken of the *Head* of the Boiler, to waſh it very clean, and to wipe it ſo dry that no Dampneſs or Moiſture may be left in, or appear upon it; after which, it ſhould be put in as dry a Place as poſſible, that in the Intervals of uſing, it may not contract any Thing dangerous or offenſive: And I am inclined to think, that the Boatſwain's or Carpenter's Store-room, would in this reſpect, be the fitteſt Repoſitory for it. As to the Boiler itſelf, after being waſhed as above, it may be immediately uſed in dreſſing Victuals for the Ship's Company, without any Danger of ſpoiling the Proviſions, or of proving pernicious to thoſe who eat them. For after the Sediment is carefully waſhed out, there will remain nothing nauſeous or unpleaſant, nothing that can prove offenſive either to the Taſte or Smell, or detriment any Victuals that may be afterwards dreſſed in it.

As it is univerſally agreed that the lighteſt Water is far the beſt, and fitteſt for every Uſe to which Water is applied; ſo I have found the Water procured by this Method, to be conſiderably lighter than any other

Water about *London*, except the River *Thames*; which by the *Hydroſtatick Ballance* (when well ſettled) are almoſt equal: And I dare venture to affirm, That it will be found in no reſpect inferior either in Sweetneſs or Purity to any River Water whatſoever; it being intirely diveſted by Diſtillation of all thoſe foreign Particles, ſuch as Allum, Nitre, Salt, Sulphur, Bitumen, *&c.* with which common Sea Water is found to be heavily loaded; and which the *Soap Lees* ſo effectually diſſolves and precipitates, that nothing comes off but pure, limpid, wholeſome Water, which upon repeated Experiments, has been found to make *Punch*, *Tea*, *lather with Soap*, and anſwer all ſuch ordinary Purpoſes, as effectually as any other Kind of Water.

BUT as there may be many People curious to know the Specifick Gravity of Water procured by this Method, who perhaps are either not poſſeſſed of, or are unacquainted with the Method of uſing the Inſtrument called the *Hydroſtatick Ballance*; ſuch Perſons may ſatisfy themſelves in this Point by obſerving carefully the following Directions; which tho' not ſo much to be relied on as a Mathematical Demonſtration, will yet be found nearly as juſt, and ſubject to very little Variation. Take an ordinary Pint Bottle, with a pretty long Neck, and having ballanced it, fill it full of *Common Sea Water*, and take an Account of what it weighs: Then emptying out the Sea Water, and ballancing the Bottle again, fill it exactly to the ſame Height with *common Conduit Water*, and note the Weight of it: Then emptying and ballancing your Bottle a third Time, fill it to the ſame Height with your *Diſtilled Water*; and by obſerving and comparing the Difference of the ſeveral Weights, you'll remain convinced, that the Diſtilled Water is ſpecifically lighter, and conſequently much purer than any of the other two.

It may now be neceſſary to give ſome particular Directions, how to procure and preſerve the *Menſtruum* itſelf: And *firſt*, great Care muſt be taken to purchaſe the Lees of ſome Soap-boiler of Credit and Reputation; one who has Humanity and Honeſty enough not to impoſe upon or deceive you in a Matter of ſuch Conſequence: Tho' I'm willing to believe there are few ſo deſtitute of all Regard to their own Character, or the Welfare of their Fellow Creatures, as to be guilty of ſo groſs an Impoſition. But that too great a Confidence may not be repoſed, where there is a Poſſibility of its being abuſed, I ſhall for the Safety and Security of all who practice this Method, lay down a Rule to be obſerved in the Purchaſe of theſe *Lees*, by which it will be out of any Man's Power to impoſe upon you, and whereby you will be able to ſatisfy yourſelf of their intrinſick Goodneſs: One *Wine Quart* then, of true, genuine, unadulterated, *Capital Lees*, will weigh *Two Pounds ſix Ounces Averdupoize*, allowing for the Weight of the Bottle or other Veſſel in which they are contained. This is the true Specifick Gravity of ſuch *Lees* as are neceſſary to be uſed in the Practice of this Method; and if they deviate from this Standard, you may conclude them bad, and unfit for your Purpoſe. And *ſecondly*, When you have procured what Quantity of *Lees* you think neceſſary; put them into Stone Quart Bottles, or Wicker Flaſks, ſuch as are imported with *German* Spaw Water (which I judge preferable to Bottles) and ſtop them with Stoppers made of Bees Wax, tied down very firm and cloſe with Leather, or Pieces of Hogs Bladders, and then pack them up in a proper Manner for Sea Service or Store. By this Method the *Lees* may be preſerved *Time out of Mind*, will retain their original Strength and Goodneſs, and be attended with the ſame Succeſs as if directly uſed.

Were I here to enumerate the various Trials and Experiments, which I have made on Sea Water with *other Materials*, it would greatly enlarge this Pamphlet, but be of no real Utility or Advantage to any Perſon but the Printer; as there are no *Preparatives* which I have hitherto uſed, that I have found to be ſo ſafe, eaſy, and ſucceſsful, as that which I now recommend. But at once to ſilence the Cavils of the Ill-natured and Cenſorious, and to convince the World, that the Methods formerly publiſhed to procure Freſh Water at Sea by Diſtillation, are attented with ſo many Hazards and Inconveniences, as to render them in a great Meaſure ineffectual; and that the Diſcovery which I have made, is not merely accidental, or the Effect of one ſingle Effort, but of a conſtant indefatigable Application; I ſhall beg Leave to particularize

rize a few, of the numerous Trials which I made in the Proſecution of this Deſign.

The firſt Experiment I made, was with *Sal Armoniac*, and *unſlack'd Lime*, of each equal Parts, and two Parts of *Salt* of *Tartar*: I beat them ſeparately into a Powder, and afterwards mixed them together, and put them into a ſtrong Coppel, or ſtrong unglazed Earthern Pan, which I ſet in a gentle ſand Heat, till the Matter began to ſwell and rarify; I continued this Heat, till it ſunk down a little, and then covered the Pan or Coppel with a Lid, and gradually increaſed the Fire, till the Materials were melted; then took it off, and when it was cold ſtopt it up cloſe: And upon uſing it afterwards in Diſtillation, I found that *four Ounces* of this Preparation, was ſufficient to alter *ſixteen* Gallons of the Sea Water, into *twelve* Gallons of good Freſh Water.

The next Experiment I made, was with two Pounds of *Engliſh Pot Aſhes*, and one

Pound of *Lime*, beat together to a Powder, which I put into *twelve* Gallons of Sea Water, and from thence diſtilled *ten* Gallons and a *half* of Water, which, though very Freſh, had a nauſeous and urinous Taſte and Smell; and which ſtill remained, notwithſtanding I kept that Water by me upwards of ſix Months.

I AFTERWARDS made another Trial of *Salt* of *Tartar*, and *Quick Lime*, which indeed effectually altered the Nature and Quality of the Sea Water, and made it perfectly Freſh: But I found, that this, as well as the other Materials I uſed, being *Powders*, were by no Means not proper to be put into the Ship's Boiler, as the *Reſiduum*, or Dregs, which remained after Diſtillation, were of a very *noxious Quality*; and might ſpoil whatever Victuals ſhould be afterwards dreſſed in it, and prove extremely pernicious to the People who eat them.

AND here, I cannot help remarking, That by the *Analyſis* which I made of this laſt

Preparative, and the Method diſcovered by the late Mr. *Appleby* of *Durham*, and publiſhed by him; I found his *Lapis Infernalis* to be nothing more than rough *Salt of Tartar*, and his *Calcin'd Bones*, to be downright *Quick Lime*; which is further corroborated, by their producing the ſame Effect, *viz.* rendering the Veſſel in which they are diſtilled unfit for any other Purpoſe; and by *his* prohibiting the Uſe of the Ship's Boiler in this Proceſs.

NOR can I avoid taking this Opportunity of doing myſelf a Piece of Juſtice, in acquainting the Publick; that in the Month of *January* 1754, when Mr. *Appleby* applied to the Right Hon. the Lords of the *Admiralty*, for a Referrence to examine his Diſcovery; I made an Application of the ſame Nature, which being readily granted, both our Methods were examined and tried at the ſame Time, though not in the ſame Manner; For my Method was tried in a *common Still*, and was attended with the expected Succeſs; but that *ingenious Gentleman*, whether from a Dubiouſneſs of the ſuperior Efficacy of his *Menſtruum*, if tried in a common Still, or for ſome other cogent Reaſons, procured a Still to be made, according to his own *particular Directions*; which being no thicker at Bottom, than an ordinary Tin Pot; his Diſtillation was thereby more accelerated than mine, was performed with a ſmaller Quantity of Fuel, and by the *learned Examinants*, judged preferable. However this Diſcovery might advance his Reputation as a Chymiſt, I ſhall not pretend to determine; but I never heard that his Method was ever brought into general Practice: Nor is it all ſurprizing, if we conſider, the great Expence and Inconvenience in purchaſing and erecting a Still on board a Ship peculiarly for this Purpoſe, and that his Still being of Copper, *untinn'd*, and only to be uſed upon a great Emergency, muſt in the Intervals, unavoidably contract Verdigreaſe, (the peculiar

Ruſt of that Metal) which being of itſelf a deadly Poiſon, muſt neceſſarily render it unfit for that, or any other Purpoſe.

And here I hope to be excuſed for making one Obſervation, which, however Foreign it may ſeem to the preſent Purpoſe, is nearly connected with the Preſervation of many Seamen's Lives. It is the Cuſtom of moſt of our Men of *War*, *India*, *Guinea*, *African*, and other Ships, that make long Voyages, when they come Home, and are Loading, and Refitting for another Voyage, to lay by the Copper which is uſed for dreſſing the Victuals at Sea, till within a few Days of their ſetting Sail: It is undeniably true, that Copper, when diſuſed for any Length of Time, will contract Verdigreaſe, and though all poſſible Care be taken to clean it before it is uſed, yet the Ruſt will penetrate ſo far into the Pores of the Metal, as to render the Eradication of it impracticable. This is principal (though latent) Cauſe of the Sickneſs which generally prevails in Ships when firſt fitted out; and ought therefore to be removed if poſſible. The only, and indeed the beſt Method, which I think can be taken for this Purpoſe, is to have the Coppers of ſuch Ships as ſtay any conſiderable Time at Home, hammered out and renewed by a Copperſmith; the Expence I apprehend would be but trifling, and the Advantages which would accrue from it, I'm perſuaded will be conſiderable.

BUT to return: The laſt Experiment, I ſhall at preſent take Notice of, was made with two pounds of common *Kitchen Salt*, well decripitated or roaſted in a Frying Pan, and kept conſtantly ſtirring about with a Stick, till it was quite brown. This I put hot out of the Frying-Pan into *ten* Gallons of Sea Water, from whence I drew *ſix* Gallons of Water tolerably freſh. I am of Opinion, this muſt have been the *Invention*, which was uſed by Sir *Richard Hawkins*, mentioned before in Page 5; as Chymical Preparations, were not ſo well underſtood, or ſo generally practiced, near two hundred Years ago, as in the preſent Age; nor is it probable, that either the Admiral, or any under his Command, ſhould ſo far anticipate ſo dreadful a Diſaſter, as to furniſh themſelves with any other Preventives, than ſuch a Stock of Freſh Water, as might reaſonably be deemed ſufficient for the Voyage.

I HAVE made various Trials of the Efficacy of this *Menſtruum*, with ſeveral kinds of Sea Water taken up at different Places, in order to ſatisfy myſelf, whether the Difference of the Water would in any Ways alter its Effects: Being informed that the Water was very Salt at *Portſmouth*, I had a Quantity of it taken up there at High Water, and got it diſtilled by Mr. *Henry Lys*, a very eminent Diſtiller of that Place, who himſelf attended the Diſtillation, and from *ſixteen* Gallons of Sea Water, drew off *twelve* Gallons perfectly pure, ſweet, and freſh. To afford myſelf ſtill further Satisfaction, I procured a Quantity of Sea Water to be taken up at *New-Haven*, and brought to *Lewes* in *Suſſex*, being told that the Water upon that Coaſt, was more intenſely ſalt than any where elſe in the Channel; *Ten* Gallons of this Water, was diſtilled by Mr. *Baldy* of that Place, who drew off *eight* Gallons and a *half* of Water, which proved ſo fine and clear, that it was taſted and drank of by a great many Gentlemen of that Town and Neighbourhood; by ſome made into *Punch*, *Tea*, &c. and by all affirmed to be as cooling and pleaſant to the Taſte, and as proper for all Domeſtic Purpoſes, as any River Water whatſoever. Mr. *Baldy*, to try the Srength of the *Lees*, put *ten* Gallons more of the ſame Water to the *Reſiduum* or Sediment which remained in the Still, after the firſt Diſtillation; and drew off the ſame Quantity of Freſh Water as before, in no reſpect inferior, either in Sweetneſs or Purity, to the Water drawn off at firſt. Theſe two *Gentlemen* are ſtill alive, and are Men of an unblemiſhed Character and Reputation; to either of them the Curious may apply, and to both of them I appeal for the Confirmation of what I have here advanced.——From this laſt Experiment it may be reaſonably inferred, that the Strength of the *Lees*, were no Ways exhauſted, ſeeing the ſecond Draught was equal in all Reſpects to the firſt; and that they will bear four or five Repetitions, before their Efficacy is totally loſt.

BUT perhaps it may be ſaid, that the *Menſtruum's* having the ſame Effect upon the Water taken up at *New-Haven*, as at *Portſmouth*, is no concluſive Argument, that it will do ſo with all Sea Water in general; From whence a Queſtion may ariſe, Whether a larger Quantity of the *Lees*, would not be requiſite in diſtilling Water, taken up in the *Eaſtern*, and *Southern* Seas, than in the *Northern*, or *Weſtern*; as it is generally imagined, that as ſome Seas have a more ſaline Taſte than others, (owing probably to the Hotneſs or Coldneſs of the Climate,) ſo consequently, the *ſpecifick* Gravity of the Water is widely different: Which Opinion, ſeems to be confirmed by the late Mr. *Boyle*, who tells us, 'That enquiring of an obſerving Perſon, who had 'been at *Moſambique*, which is thought to 'be one of the hotteſt Places in the World, 'whether he did not there find the Sea to 'be more than ordinarily ſalt? He anſwered, that coming thither in a great *Carack*, 'when he returned from the Town to the 'Ship, he obſerved near two Hands Breadth 'of the Veſſel riſen above the ordinary Part 'to which it uſed to ſink; ſo that he took 'Notice of it to the Captain, as fearing that 'Part of the Lading, had been by Stealth 'carried to Shore: But the Pilot, who had 'made thirteen or fourteen Voyages to the '*Indies*, aſſured him, that what he had obſerved about the Ship, was uſual in that

‘ Place, where the Taſte diſcovered the ‘ Water to be exceeding ſalt.’

To afford myſelf and others, a ſatisfactory Solution of a Doubt of this Nature; I ſent a Quantity of the *Soap-Lees*, with proper Directions to Mr. *Richard Phillips*, an eminent Surgeon at *Droitwich* in *Worceſterſhire*, where there is a Spring (commonly called the *Briney Spring*) ſo exceeding ſalt, that from one Pint of it which weighs a Pound and a Half, there is extracted a whole Pound of common Salt; and deſired he would diſtill ſome of this Water (or more properly *Brine*, it being reckoned eight times Salter than any Sea Water) with a proportionable Quantity of the *Lees* I ſent him, and acquaint me with the Reſult. This *Gentleman* wrote me Word, that having put the *Menſtruum* into *ten* Gallons of the *Brine*, drawn directly from the Spring, and diſtilled it himſelf, he procured *eight* Gallons, *two* Quarts, and *one* Pint of as Freſh ater as any whatever;

ever; and expreſſes his Satisfaction, in the Trial of a Method ſo manifeſtly conducive to the Publick Good. Hence, we may reaſonably conclude, that the ſame Quantity of *Soap Lees*, will have nearly the ſame Effect upon Water taken up in any Part of the Ocean.

I HAVE now communicated this Diſcovery in as full and particular a Manner as is poſſible, and given ſuch plain Directions for the Practice of it as can ſcarce be miſunderſtood; And it might be expected, that in Compliance with a very indifferent Cuſtom, I ſhould now proceed to collect and obviate, or, rather endeavour to obviate, all the Objections both real and imaginary that can be raiſed againſt it: But as this would be impoſing upon myſelf a Taſk as irkſome, as I apprehend it unneceſſary; I ſhall confine myſelf to the Conſideration of the only Objection which has the moſt plauſible Appearance, and that is the great Scarcity of Fuel at Sea, and the large Quantity that is thought neceſſary to work off the Diſtillation.

AND here I ſubmit to the Judgment of all who have experienced the dreadful Calamity of a Scarcity of Freſh-Water, and who perhaps have felt the diſmal Effects which it ever produces; Whether it is not more eligible to provide an additional Quantity of Fuel for an Occaſion of this Kind, than to expoſe themſelves, and Numbers beſides, to an Event which ſo frequently happens, which is ſo often irremediable, and which is replete with the moſt fatal and deſtructive Conſequences. I am confident, there are many *worthy Gentlemen* at the Head of our Naval Adminiſtration, who have in ſome Meaſure ſuffer'd in this Extremity; and that NOBLE PERSONAGE, to whom I have preſumed to dedicate this Treatiſe, in the many Miſeries and Hardſhips which he underwent in a late Voyage round the World, and by his admirable Prudence and Humanity under them, has no leſs diſplayed thoſe ſuperlative Qualifications he is poſſeſs'd of, than he has evinced the Neceſſity of providing againſt a Cataſtrophe of the like Nature in Time to come.

BUT if we conſider this Objection ſomething more particularly, we ſhall find it to be of little or no Force. For *firſt*, As the Diſtillation is, or ſhould be made in that Diviſion of the Ship's Boiler, which is appropriated for Peaſe, *&c.* and as another Diviſion is, or may be uſed at the ſame Time for boiling Beef, and Pork, for the Ship's Company; the Communication of the Heat from the one Part to the other, will not only greatly facilitate the Diſtillation, but will alſo render much leſs Fire neceſſary, than there would otherwiſe be Occaſion for. And, *ſecondly*, If Captains and Maſters of Ships, inſtead of ſo much

Wood as they generally lay in for Sea Store, and which is of itſelf bulky, and takes up a great deal of Room, would provide themſelves with two or three Chaldron of Coals; I'm apt to think, they would find it anſwer the ſame Purpoſes in moſt Reſpects as Wood; with this further Advantage, that ſuch a Quantity of Coals would take up but little (if any) more Room, than what is requiſite for the Stowage of four or five Puncheons of Water.

As there is nothing more eſſential to the Welfare of a State, than the Care and Preſervation of its Subjects; And as this Method of procuring Freſh Water at Sea, will in a great Meaſure prevent that Havock and Deſtruction among our Seamen, which a Scarcity of it always occaſions: I ſubmit the Neceſſity of practiſing it, to thoſe *Gentlemen* who are intruſted with the Care and Management of our *Marine*

rine; and hope, I ſhall not be thought guilty of too great Preſumption, in earneſtly recommending it to their ſerious Conſideration; as it is nearly connected with the common Intereſt of the Nation, by contributing to preſerve and prolong the Lives of thoſe Men, who have ever been, (and I hope ever will be) its greateſt Safety and Security. Though at the ſame Time, I muſt confeſs, That the bare *Ipſe dixit* of an *Author* in this Caſe, is not ſufficient to eſtabliſh its Reputation, or enforce the Practice of it. It is highly reaſonable and expedient, that a previous Trial ſhould be made of its Virtue and Efficacy: Which I would adviſe to be done on board a Man of War, or other large Ship; for if it is tried at any Diſtillers, where there may have been *Juniper Berries*, *Mint*, *Wormwood*, or any ſtrong Herb, in the Still before, the Diſtilled Water, though perfectly Freſh, will contract and retain the particular Flavour of ſuch Herbs, which will undoubtedly make it have a diſagreeable Taſte of the Still. And if upon ſuch Trial, the particular Directions before laid down, be punctually obſerved, I dare affirm it will ſeldom, if ever, prove unſucceſsful.

To Conclude: As a Diſcovery of this Nature, cannot fail of being highly beneficial to Mankind in general: And as no ſelfiſh or ſiniſter Motive has induced me to publiſh it; I ſhall urge no Arguments or Perſuaſions to procure it a favourable and candid Reception; but leave it enirely dependant on its own intrinſick Worth and Merit.

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APPEN-

APPENDIX.

COMMON freſh Water, being perhaps the moſt uſeful and neceſſary Species of Proviſion for Sea Service, it is certainly of great Importance, next to the providing a ſufficient Quantity, to preſerve that Quantity ſweet and wholeſome; as it is liable to a great many Accidents, which corrupt, and render it unfit for common Uſe, and particularly in Voyages to the *Eaſt* or *Weſt-Indies*, the *Leeward-Iſlands*, or any of the hot Climates, where there generally abounds a certain Species of ſmall Worms, and other imperceptible Animalcule, which generate in the Water.

To remedy the Inconveniencies ariſing hence, and to prevent the dangerous Conſequences of drinking bad Water; I ſhall by Way of Supplement to the preceeding Diſcovery, communicate to the Publick, a Method, by which any Quantity of Freſh Water may be preſerved ſweet and wholeſome, during the longeſt Voyage, and in the warmeſt Climate.

Take of fine clear white *Pearl Aſhe* a Quarter of a Pound *Averdupoize*, and put into *one hundred* Gallons of common Freſh Water, (obſerving this Proportion to a greater or leſs Quantity) and ſtop up your Caſk as uſual, till you have Occaſion to broach it for Uſe. But you muſt be careful to procure the beſt Sort of Pearl Aſhes, which we generally import from *Hamburgh*, and which are like Loaf Sugar. They are very cheap, and may be had in any Quantities at the Dry-ſalters, or Oil-ſhops.

THESE Aſhes will diſſolve of themſelves, and will effectually purge and purify the Water from all Slime, and Filth, which it may contract. They are alſo greatly *Diuretick*, and have a peculiar Quality in quenching and allaying the moſt violent Thirſt, which renders Salts of this Nature ſo often preſcribed by the moſt eminent Phyſicians. For which Reaſons, I am of Opinion, that they ſhould be put into all Water intended for Sea Store; As it would prove a great Antidote to the Scurvy, and many other Sea Diſeaſes, and by their Aptneſs to allay Thirſt, the People on board would not perhaps have Occaſion to drink ſo often as they generally do, by which Means the Conſumption of Water would not be ſo great as it commonly is.

I MADE a Trial of the Succeſs of this Method, by putting an Ounce of Pearl Aſhes into a twenty-five Gallon Caſk of

Thames Water, which I ſtopt up very cloſe, and let it ſtand for the Space of four Months; upon opening it, and finding it in no reſpect altered, I let it ſtand four Months longer, and continued to open it once in every four Months, for upwards of a Year and a half, and conſtantly found it in the ſame unaltered Condition, and perfectly ſweet and good. I afterwards made Uſe of ſome of it in boiling Peaſe, and Burgoo, and found that it made the Peaſe as ſoft, and anſwered for all other Purpoſes to which I applied it, as well as Water freſh drawn out of the River.

THERE have been many Propoſals and Experiments made to preſerve Water from Stinking at Sea, but the Authors of them have chiefly confined themſelves to the Uſe of Lime; which tho' an admirable Remedy in diverſe Diſeaſes, and perhaps very proper to keep Water freſh; yet I cannot think it ſo uſeful for Sea Service, as the Pearl Aſhes;

as it muſt be equally as ineffectual for the boiling of Peaſe, *&c.* (which is a conſiderable Part of Ships Proviſions) as common Sea Water; And as it is of itſelf very fiery and pungent to the Taſte, and conſequently very diſagreeable, and rather apt to increaſe and inflame a Man's Thirſt, than to quench and allay it.

THIS Method therefore being ſo ſafe and eaſy, and ſo beneficial to all Perſons uſing the Sea; I ſeriouſly recommend it to the Practice of all Captains of Ships, and others who are concerned in ſupplying them with Proviſions, without offering any additional Arguments or Obſervations in its Favour.

FINIS.

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